In the Claims

Please cancel pending claim 1 and insert the following new claims 2-36.

2. A powder composition comprising a plurality of particulate microstructures, said microstructures comprising an active agent and at least 20 % w/w surfactant, wherein said microstructures comprise a geometric diameter of 1-30, an aerodynamic diameter of less than 5 microns, and a bulk density of less than about 0.5 g/cm^3.

3. The powder of claim 2 further comprising calcium.

4. The powder of claim 2 comprising a mean porosity of 0.5 – 80%.

5. The powder of claim 4 wherein the microstructures comprise a porosity of 2-40%.

6. The powder of claim 5 further comprising a mean pore size of 20 – 200 nm.

7. The powder of claim 6 further comprising a mean pore size of 50 – 100 nm.

8. The powder of claim 2 further comprising a fine particle fraction of greater than 20%.

9. The powder of claim 8 further comprising a fine particle fraction within 30-70%.

10. The powder of claim 2 wherein the bulk density is less than 0.1 g/cm^3.

11. The powder of claim 2 wherein the bulk density is less than 0.05 g/cm^3.

12. The powder of claim 2 wherein said particulate microstructures comprises hollow porous microspheres.

13. The microspheres of claim 12 further comprising a shell thickness between 0.1 – 0.5 nm.

14. The powder of claim 2 wherein the mean aerodynamic diameter of said particulate microstructures is between 0.5 and 5 μm.

15. The powder of claim 14 wherein said particulate microstructures have a mean geometric diameter of less than about 5 μm.

16. The powder of claim 2 wherein said surfactant is selected from the group consisting of phospholipids, nonionic detergents, nonionic block copolymers, ionic surfactants, biocompatible fluorinated surfactants and combinations thereof.

17. The powder of claim 16 wherein said surfactant is a phospholipid.

18. The powder of claim 17 wherein said phospholipid is selected from the group consisting of dilauroylphosphatidylcholine, dioleylphosphatidylcholine, dipalmitoylphosphatidylcholine, disteroylphosphatidylcholine dibehenoylphosphatidylcholine, diarachidoylphosphatidylcholine and combinations thereof.

19. The powder of claim 18 wherein said phospholipid comprises a gel to liquid crystal transition temperature of greater than 40° C.

20. The powder of claim 2 wherein said active agent is a bioactive agent.

21. The powder of claim 20 wherein said bioactive agent is selected from the group consisting of antiallergics, bronchodilators, pulmonary lung surfactants, analgesics, antibiotics, leukotriene inhibitors or antagonists, antihistamines, antiinflammatories, antineoplastics, anticholinergics, anesthetics, anti-tuberculars, imaging agents, cardiovascular agents, enzymes, steroids, genetic material, viral vectors, antisense agents, proteins, peptides and combinations thereof.

22. The powder of claim 20 wherein the bioactive agent is selected from the group consisting of nicotine, fentanyl, morphine, lung surfactant, LHRH, PTH, leuprolide, interferon, goserelin, and growth hormones.

23. A powder composition of claim 2 wherein said particulate microstructure comprises a perforated microstructure.

24. A powder composition comprising a plurality of particulate microstructures, said microstructures comprising a bioactive agent and at least 20 % w/w of a phospholipid selected from the group consisting of dilauroylphosphatidylcholine, dioleylphosphatidylcholine, dipalmitoylphosphatidylcholine, disteroylphosphatidylcholine dibehenoylphosphatidylcholine, diarachidoylphosphatidylcholine and combinations thereof, wherein said microstructures comprise a geometric diameter of 1-30, an aerodynamic diameter of less than 5 microns, and a bulk density of less than about 0.5 g/cm^3.

25. A powder composition comprising a plurality of particulate microstructures, said microstructures comprising calcium and at least 20 % w/w of a phospholipid.

26. The powder of claim 25 wherein said microstructures comprise a geometric diameter of 1-30, an aerodynamic diameter of less than 5 microns, and a bulk density of less than about 0.5 g/cm^3.

27. A powder composition comprising a plurality of particulate microstructures, said microstructures comprising a mean porosity of 0.5 – 80%, wherein said microstructures comprise a geometric diameter of 1-30 microns, an aerodynamic diameter of less than 5 microns, and a bulk density of less than about 0.5 g/cm^3.

28. The powder of claim 27 comprising an active agent.

29. The powder of claim 28 comprising a mean porosity of 2-40%.

30. The powder of claim 29 further comprising a mean pore size of 20 – 200 nm.

31. The powder of claim 30 further comprising a mean pore size of 50 – 100 nm.

32. The powder of claim 31 comprising a tap density of less than 0.1 g/cm^3.

33. The powder of claim 32 wherein said particulate microstructures comprise hollow and porous microspheres.

34. A powder composition comprising a plurality of particulate microstructures, said microstructures comprising a shear index less than 0.98, wherein said microstructures comprise a geometric diameter of 1-30 microns, an aerodynamic diameter of less than 5 microns, and a bulk density of less than about 0.5 g/cm^3.

35. The powder according to claim 34 comprising a shear index of less than 1.1.

36. The powder according to claim 34 comprising a shear index of less than 1.5.

37. The powder of claim 34 wherein said microstructures further comprise a bioactive agent and at least 20 % w/w of a phospholipid selected from the group consisting of dilauroylphosphatidylcholine, dioleylphosphatidylcholine, dipalmitoylphosphatidylcholine, disteroylphosphatidylcholine dibehenoylphosphatidylcholine, diarachidoylphosphatidylcholine and combinations thereof.

38. The powder of claim 37 wherein said phospholipid comprises a gel to liquid crystal transition temperature of greater than 40° C.